

Claims

We claim :

- 5 1. A VUV-excited device including a discharge chamber with a phosphor coating, the discharge chamber containing a rare gas or rare gas mixture, the phosphor coating being applied to an inner surface of the discharge chamber, the device when operated generating a discharge which emits vacuum ultraviolet radiation as a primary source of excitation, the phosphor coating containing a europium-activated, calcium-substituted
10 barium hexa-aluminate phosphor.
2. The VUV-excited device of claim 1 wherein the europium-activated, calcium-substituted barium hexa-aluminate phosphor has a composition which is represented by $Ba_{1.29-x-y}Ca_xEu_yAl_{12}O_{19.29}$, wherein $0 < x < 0.25$ and $0.01 < y < 0.20$.
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3. The VUV-excited device of claim 1 wherein the device generates a vacuum ultraviolet light having a wavelength of 147 nm to 173 nm.
4. The VUV-excited device of claim 1 wherein the discharge chamber contains
20 xenon or a mixture of xenon and helium.
5. The VUV-excited device of claim 1 wherein the phosphor coating additionally contains a phosphor selected from the group consisting of europium-activated barium magnesium aluminate, europium-activated barium magnesium aluminate coated with
25 aluminum oxyhydroxide, and $(Gd,Lu)PO_4:Tm,Li$.
6. The VUV-excited device of claim 1 wherein the phosphor coating additionally contains a $(Gd,Lu)PO_4:Tm,Li$ phosphor and a ratio of the europium-activated, calcium-substituted barium hexa-aluminate phosphor to the $(Gd,Lu)PO_4:Tm,Li$ is in the range
30 from 2:1 to 20:1 by weight.

7. The VUV-excited device of claim 1 wherein the europium-activated substituted barium hexa-aluminate phosphor is coated with aluminum

8. A VUV-excited device including a discharge chamber with a phosphor coating,
5 the discharge chamber containing a rare gas or rare gas mixture, the phosphor coating being applied to an inner surface of the discharge chamber, the device when operated generating a discharge which emits vacuum ultraviolet radiation as a primary source of excitation, the phosphor coating containing a europium-activated, calcium-substituted barium hexa-aluminate phosphor having a composition which is represented by
10 $Ba_{1.29-x-y}Ca_xEu_yAl_{12}O_{19.29}$, wherein $0 < x < 0.25$ and $0.01 < y < 0.20$.

9. The VUV-excited device of claim 8 wherein the device generates a vacuum ultraviolet light having a wavelength of 147 nm to 173 nm.

10. The VUV-excited device of claim 8 wherein the discharge chamber contains xenon or a mixture of xenon and helium.

11. The VUV-excited device of claim 8 wherein the phosphor coating additionally contains a phosphor selected from the group consisting of europium-activated barium
20 magnesium aluminate, europium-activated barium magnesium aluminate coated with aluminum oxyhydroxide, and $(Gd,La)PO_4:Tm,Li$.

12. The VUV-excited device of claim 8 wherein the phosphor coating additionally contains a $(Gd,La)PO_4:Tm,Li$ phosphor and a ratio of the europium-activated, calcium-substituted barium hexa-aluminate phosphor to the $(Gd,La)PO_4:Tm,Li$ is in the range
25 from 2:1 to 20:1 by weight.

13. The VUV-excited device of claim 8 wherein the europium-activated, calcium-substituted barium hexa-aluminate phosphor is coated with aluminum oxyhydroxide.

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14. A method of generating blue light comprising exciting a blue-e
with vacuum ultraviolet radiation, the blue-emitting phosphor compris
activated, calcium-substituted barium hexa-aluminate phosphor.

5 15. The method of claim 14 wherein the europium-activated, calcium-substituted
barium hexa-aluminate phosphor has a composition which is represented by
 $Ba_{1.29-x-y}Ca_xEu_yAl_{12}O_{19.29}$, wherein $0 < x < 0.25$ and $0.01 < y < 0.20$.

16. The method of claim 14 wherein the device generates a vacuum ultraviolet light
10 having a wavelength of 147 nm to 173 nm.

17. The method of claim 15 wherein the device generates a vacuum ultraviolet light
having a wavelength of 147 nm to 173 nm.

15 18. The method of claim 14 wherein the phosphor coating additionally contains a
phosphor selected from the group consisting of europium-activated barium magnesium
aluminate, europium-activated barium magnesium aluminate coated with aluminum
oxyhydroxide, and $(Gd,La)PO_4:Tm,Li$.

20 19. The method of claim 14 wherein the phosphor coating additionally contains a
 $(Gd,La)PO_4:Tm,Li$ phosphor and a ratio of the europium-activated, calcium-substituted
barium hexa-aluminate phosphor to the $(Gd,La)PO_4:Tm,Li$ is in the range from 2:1 to
20:1 by weight.

25 20. The method of claim 14 wherein the europium-activated, calcium-substituted
barium hexa-aluminate phosphor is coated with aluminum oxyhydroxide.